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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/707,609

12/24/2003

YU-WEN CHEN

10073-US-PA

1608

31561

7590

12/09/2004

JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE
7 FLOOR-1, NO. 100
ROOSEVELT ROAD, SECTION 2
TAIPEI, 100
TAIWAN

EXAMINER

TRINH, HOA B

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 12/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/707,609	CHEN ET AL.	
	Examiner	Art Unit	
	Vikki H Trinh	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 November 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date. _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I, claims 1-17, in the reply filed on Nov. 09, 2004, is acknowledged.
2. Claims 1-17 are pending in this present application.

Specification

3. The disclosure is objected to because of the following informalities: the fonts should be 12 points font, instead of 14 points font.

Appropriate correction is required.

Claim Objections

4. Claims 1-17 are objected to because of the following informalities: The claims have printed lines across the claim pages when applicants faxed the claim pages to the Office. It is suggested that applicants should try to make sure that a good copy of any submitted material to the U.S. Patent Office is received. Appropriate correction is required.
5. Claims 5 and 13 are objected to because of the following informalities: in claim 5, line 2, and claim 13, line 2, the phrase "but not" denotes a negative connotation. Applicant is advised to positively recite the claimed subject matter. Appropriate correction is required.

Double Patenting

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686

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F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims 1-2, 5-8, 10, 13-17 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-7 of U.S. Patent No. 6,825,568. Although the conflicting claims are not identical, they are not patentably distinct from each other because the term "first" or the term "second" is relative, and that each term is interchangeable. Thus, claim 1 of patent '568 recited the "second" bump being larger than the size of the "first" bump is obviously the same as the language of claim 1 of the present application which states that the "first" bump has a volume larger than a volume of the "second" bump. (Note that the term "first" and "second" is interchangeable.)

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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9. Claims 1- are rejected under 35 U.S.C. 102(e) as being anticipated by Hsu et al. (Hsu) (6,774,498).

As to claim 1, Hsu discloses a flip chip package having a chip 10(fig. 1) with a first bump-positioning region (see attachment); a substrate 30 (fig. 1) having a second bump positioning region (see attachment), at least a first hole (see attachment) and a plurality of second holes (see attachment), wherein the first hole and the second holes are located within the second bump positioning region, the first hole has a depth greater (see attachment) than the second holes; at least a first bump 40 (fig. 1) arranged between the first bump positioning region of the chip 10 and the second bump positioning region of the substrate 30 (fig. 1), wherein the second bumps 20 (fig. 1) and the substrate 30 are bonded together via the second holes; wherein the first bump 40 (fig. 1) has a volume larger than a volume of the second bump 20 (fig. 1). See attachment.

As to claim 2, the package structure has a first bump 40 and a first hole (see attachment). The first bump 40 (fig. 1) is located in the middle of the second bump positioning region. See attachment. Note that the term "middle" is a relative term.

As to claim 3, the package structure has two first bumps 40 (fig. 1) and two first holes (see attachment), the two first bumps 40 are positioned between the chip 10 (fig. 1) and the substrate 30 (fig. 1) and symmetrical relative to a centroid of the first bump positioning region (see attachment), and the two first holes are positioned in the second bump positioning region (see attachment) and symmetrical relative to a centroid of the second bump positioning region. See attachment.

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As to claim 4, the package structure has a plurality of first bumps 40 (fig. 1) and the first bumps 40 (fig. 1) are located close to corners of the first bump positioning region and located between the chip 10 and the substrate 30, and the substrate has a plurality of first holes and the first holes are positioned close to corners of the second bump positioning region. See attachment.

As to claim 5, the first bump 40 (fig. 1) is arranged between the chip 10 (fig. 1) and the substrate 30 (fig. 1). However, the first bump 40 (fig. 1) does not electrically connect the chip 10 (fig. 1) and the substrate 30 (fig. 1).

As to claim 6, the first bump 40 (fig. 1) is arranged between the chip 10 and the substrate 30 electrically, and physically connects the chip 10 (fig. 1) and the substrate 40 (fig. 1).

10. Claims 1-3, 5-6, 8-15, and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Andrews (5,352,926).

As to claims 1 and 17, Andrews discloses a flip chip package having a chip 30 (fig. 1) with a first bump-positioning region (see attachment); a substrate 10 (fig. 1) having a second bump positioning region (see attachment), at least a first hole 22 (see attachment) and a plurality of second holes 22 (see attachment), wherein the first hole and the second holes are located within the second bump positioning region, the first hole has a depth greater (see attachment) than the second holes; at least a first bump 32, 23 (fig. 1) arranged between the first bump positioning region of the chip 30 and the second bump positioning region of the substrate 10 (fig. 1), wherein the second bumps 23, 28 (fig. 1) and the substrate 10 are bonded together via the second holes 22; wherein the first bump 32, 23, 28 (fig. 1) has a volume larger than a volume of the second bump 23,28 (fig. 1). See attachment.

As to claim 2, the package structure has a first bump 32, 23, 28 (fig. 1) and a first hole 22 (see attachment). The first bump 32, 23, 28 (fig. 1) is located in the middle of the second bump positioning region. See attachment. Note that the term "middle" is a relative term.

As to claim 3, the package structure has two first bumps 32, 33, 34 (fig. 1) and two first holes 22 (see attachment), the two first bumps 32, 34 (fig. 1) are positioned between the chip 30 (fig. 1) and the substrate 10 (fig. 1) and symmetrical relative to a centroid of the first bump positioning region (see attachment), and the two first holes are positioned in the second bump positioning region (see attachment) and symmetrical relative to a centroid of the second bump positioning region. See attachment.

As to claims 5 and 13, the first bump 32, 23 (fig. 1) is arranged between the chip 30 and the substrate 10 physically "but not" connects electrically to the chip 30 and the substrate (fig. 1).

As to claims 6 and 14, the first bump 32, 23, 28 (fig. 1) is between the chip 30 and the substrate 10 electrically and physically connects the chip 30 and the substrate 10 (fig. 1).

As to claim 8, Andrews discloses a flip chip package structure having a chip 30 (fig. 1) with a first bump positioning region (see attachment); at least a first bump 32, 23, 28 arranged within the first bump positioning region; and a plurality of second bumps 23, 28 (see attachment, fig. 1) arranged within the first bump positioning region, wherein the first bump 32, 23, 28 has a configuration different from that of the second bump 23, 28 (fig. 1; see attachment).

As to claim 9, the first bump 23 (fig. 1) has a height greater than the second bump 23 (fig. 1). See attachment.

As to claim 10, the first bump 23 positioned in the middle of the first bump positioning region of the chip 30 (fig. 1).

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As to claim 11, the package structure has two first bumps 32, 34 (fig. 1) that are positioned on the first bump positioning region of the chip and symmetrical relative to a centroid of the first bump positioning region of the chip 30 (fig. 1).

As to claim 12, the package structure has a plurality of first bumps 32, 34, 33 positioned close to the corners of the bump positioning region of the chip 30 (fig. 1).

As to claim 15, the package structure has a conductive pillar 32 (fig. 1) arranged on the chip 30 (fig. 1); and a soldering block 27 (fig. 1) arranged on the conductive pillar 32.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

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evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

14. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Andrews (5,352,926), as applied to claim 8 above.

Andrews discloses the invention substantially as claimed. However, Andrews does not explicitly teach a specific range of measurement for the height of the first bump. Nevertheless, it would have been obvious to one skilled in the art at the time the invention was made to modify the first bump of Andrews with a range for the height measurement, since it is a prima facie obvious to an artisan for optimization and experimentation to specify a range of measurement for the height of the first bump because applicants have not yet established any criticality for the specific range.

Note that the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising therefrom. Where patentability is aid to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. (In re Woodruff, 919 F.2d 1575, 1578 (Fed. Cir. 1990).)

Allowable Subject Matter

15. Claim 7 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record does not disclose or fairly suggest either in singly or in combination a flip

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chip package structure having a filler material disposed between the chip and the substrate and encapsulating the first bumps and the second bumps.

Conclusion

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Vikki Trinh whose telephone number is (571) 272-1719. The Examiner can normally be reached from Monday-Friday, 9:00 AM - 5:30 PM Eastern Time. If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Mr. Wael Fahmy, can be reached at (571) 272-1705. The office fax number is 703-872-9306.

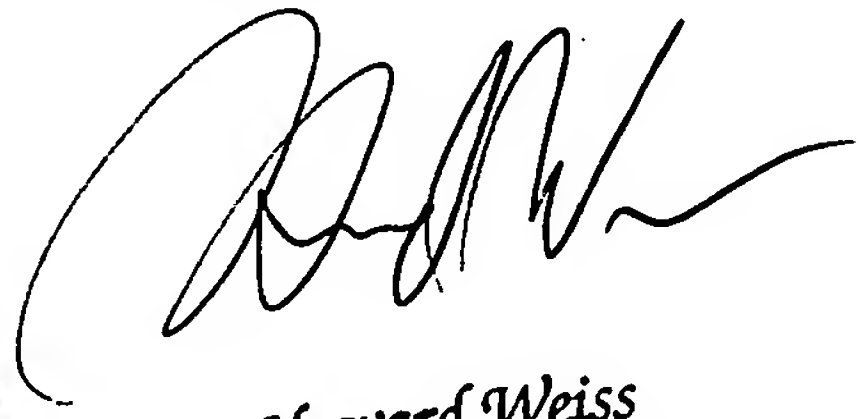
Any request for information regarding to the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Also, status information for published applications may be obtained from either Private PAIR or Public Pair. In addition, status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. If you have questions pertaining to the Private PAIR system, please contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

Lastly, paper copies of cited U.S. patents and U.S. patent application publications will cease to be mailed to applicants with Office actions as of June 2004. Paper copies of foreign patents and non-patent literature will continue to be included with office actions. These cited U.S. patents and patent application publications are available for download via the Office's PAIR. As an alternate source, all U.S. patents and patent application publications are available on the USPTO web site (www.uspto.gov), from the Office of Public Records and from commercial sources. Applicants are referred to the Electronic Business Center (EBC) at <http://www.uspto.gov/ebc/index.html> or 1-866-217-9197 for information on this policy. Requests

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to restart a period for response due to a missing U.S. patent or patent application publications
will not be granted.

Vikki Trinh,
Patent Examiner
AU 2814


Howard Weiss
Patent Examiner